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Success of Adaptive Ground Water Cleanup at LLNL

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We are employing "smart" pump and treat in the remediation of a volatile organic compound (VOC) plume in ground water at Lawrence Livermore National Laboratory (LLNL), and have achieved significant accomplishment toward cleanup. With the characterization of the subsurface, the VOC plume has been delineated in two of the hydrostratigraphic units (HSU) at the site. With our phased-in construction and operation of extraction wells, beginning in 1989, we have reduced the VOC concentrations in HSU-2 by an order of magnitude, drawn back the HSU-1B 500 ppb contour over 1000 feet, and established hydrologic control over the leading edge of the plume. The reduction in concentrations in the distal portion of the plume has been validated by calculating the contaminant mass removal required to produce the shrinking contours and comparing those values with the measured mass removed at the treatment facility. There is excellent agreement between the two values. In addition, an emerging California State policy regarding cessation of remediation upon reaching the asymptotic part of the cleanup curve is approaching promulgation.

This State policy allows the use of limited non-attainment areas where residual ground water contamination exceeds water quality objectives (such as drinking water standards) as an option for ground water quality and use management strategy. The final phase of construction of the well field in this area is scheduled for completion by the end of FY96. Based upon the analysis of six years of pumping history, it is possible that the concentrations in the ground water, throughout the area, may be on the asymptotic part of the cleanup curve in the next five years. Extrapolating this success to the adaptive ground water cleanup being phased in across the site may enable the dramatic shortening of the site cleanup time and expenditures.

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